

### **Learning Activity 4**

In this activity, students will be presented with six different decimals word problems. There will be all four operations represented in the problems since this lesson follows activities involving all four operations. The class will start with each student using polleverywhere.com to enter which operation he or she feels goes with each problem. Poll Everywhere is site where people can respond to poll using a mobile device and the data will be graphed instantaneously. There will be a class discussion regarding which operation should be used for each of the six problems. After working in individually to solve, students will share their answers and how they arrived at them. Students will enter their solutions into polleverywhere.com for each problem and will use this data to discuss which solution is correct. They will use the class set of iPod Touches to access poll everywhere.

The class will begin with students gathered on the carpet in front of the Smartboard with the iPod Touches. After deciding on the operations for each problem, the students will work independently to find solutions. Then students will gather on the carpet again to share solutions.

Before participating in the activity, students will need to know how to access poll everywhere using a shortcut on their home screen to the website. Students should also be familiar with using Safari and how to enter data on a website. The teacher will prepare the students for the lesson by modeling how to find the shortcut on the home screen of the iPod and how to enter data on poll everywhere.

### **Learning objective**

The activity is intended for use with 6<sup>th</sup> grade math students. The standard this activity is addressing is students will fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. In addition, students should know how to decide what operation to use when

solving word problems. When finished with this activity, students should be able to determine the operation of any word problem and be able to add, subtract, multiply or divide any decimals with precision and accuracy.

### **Technology Integration**

Poll everywhere and the use of the iPod Touches will enhance the lesson by improving discussions and increasing time spent on educational activities. By using the iPod Touches to access the internet, students can access poll everywhere much quicker by simply touching the shortcut and entering the data. If a computer was used to access poll everywhere, students would need to log on, open a web browser, and then enter the data. Minutes that were used to log on now can be used to further classroom discussion and learning.

Poll everywhere will enhance the level of discussion of the word problems. It will first make all students accountable because each child will have to enter an answer to each problem. Each child will also have to have an answer to share. In addition, I plan to have the graph of the results up on the Smartboard while students are responding so the data will change as responses are received. By doing this, misconceptions are uncovered quickly, especially if a majority of the class answers incorrectly. We can have class discussions on whether or not an answer with the most responses necessarily means this is the correct answer. These kinds of discussions are difficult to have if just one student is sharing their thoughts at a time. Without poll everywhere, it would be very difficult for students to see an overall picture (graph) of student responses at one time.

By using poll everywhere, all students now have a voice and the teacher no longer needs to decide who will share solutions to the problems. The students now control what is said and can ask questions of each other instead of the teacher asking the questions.

To support students throughout this activity, I will be available for assistance to help with the iPods and poll everywhere. In addition since this is not the first time we have used poll everywhere in class, the classroom tech support students can help students to troubleshoot issues that arise.

## **Connection to Standards**

Common Core Standard:

[CCSS.Math.Content.6.NS.B.3](#) Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation

Technology Standards:

1. Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
2. Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

## **Student Prior Knowledge**

I will be assessing student prior knowledge in the lessons leading up to this activity. Through informal and formal assessments, such as quizzes, I will be able to determine who has the knowledge necessary to operate with decimals. I will also assign homework problems the night before that require students to add, subtract, multiply and divide decimals. I will use this as one last assessment to determine what knowledge students bring into this activity.

To support those students who do not have the knowledge, I will make sure they are working with a partner who does have the necessary knowledge. I will also make sure to visit these students first when the activity begins. I will help these students by asking questions that will guide them in the correct direction. In addition, the students all have a list of words that signal different operations. This is a list that we are constantly updating. For students who don't have the prior knowledge, I will encourage them to use this list of keywords to help them in deciding what operation to use.

### **Content Knowledge**

To be successful in teaching this lesson, teachers must have a strong foundation in decimals. Teachers must understand how place value is determined in decimals. Teachers must know the algorithm for adding, subtracting, multiplying, and dividing decimals. They must also understand the reasoning behind these algorithms. Knowing how to determine operations in word problems is also a key component of the math knowledge of this lesson. The teacher must understand how certain words signal a certain operation and how to help students to visualize a problem when those keywords are not present.

Lastly, teachers should be aware of common misconceptions when solving word problems. For example, often times students think that "total" always means to add or students think that "each" always means to divide. Another common misconception is that "how many" or "how much" is a clue as to what operation to use. Teachers should also be familiar with the misconceptions associated with adding, subtracting, multiplying, and dividing decimals. Teachers should know that many students will forget to line up decimals when adding and subtracting, especially if the numbers have different decimal places. Students often place the decimal in the wrong place when multiplying decimals. Finally, students will forget where to place the decimal in a quotient or will mix up the divisor and the dividend.

## **Pedagogical Knowledge**

I chose to start the lesson by having students working individually to choose the operation because at this point in the year students should be capable of determining an operation on their own. Before this lesson, we have had other lessons on choosing operations. Students have worked with whole number and fraction word problems. We have had several class discussions on keywords and strategies for choosing operations. Students have been set up with activities before this lesson to prepare them with the knowledge to be able to determine the operation individually.

I also chose to have students determine the operation before actually doing the math so that I could assess the two parts separately. By having a separate discussion on the operations, I can determine who does not understand how to choose the operation and keep that separate from those who do not know how to fluently operate with decimals. If I had combined the two sections together, choosing the operation and finding a solution, it would be more difficult to decide who doesn't know how to choose an operation from who doesn't understand how to add, subtract, multiply, and/or divide decimals.

I also chose to have students work individually on the problems because of the same reason mentioned in the choosing operation section. By discussing the appropriate operations ahead of time, students are now set up to do the operation. If students answer the questions incorrectly at this point, then I know who needs more support in learning how to operate with decimals.

I choose to have class discussions after both sessions so that students can learn from each other. In having a class discussion, misconceptions are uncovered and solved through student discussion. Students learn from each others' mistakes. Also, students tend to correct themselves when they have to share their thinking with the class. For example, a student may stop himself halfway through an explanation and realize a mistake that he made. Also, since choosing operations can be very difficult for some students and there are a lot of misconceptions when working on this concept, a class discussion would be appropriate.

## **Technology Knowledge**

Knowledge of polleverywhere.com, a Smartboard, and iPods are necessary for a teacher to be successful in this lesson. A teacher needs to know how to create an account on the polleverywhere. In addition, a teacher must know how to create a poll, start a poll, and show the results of a poll. A teacher must know how to create a link to a poll on polleverywhere. Also, a teacher must know how to use the Smartboard to project the results from the poll. When using the iPod, a teacher must understand the basic functions of the iPod (how to turn on, connect to wifi, find a shortcut, and enter data on Safari) and must know how to create a shortcut to a website. Finally, a teacher must know how to place this shortcut on each iPod using the iPhone configuration software.

## **TPACK Analysis**

I chose to teach decimal word problems with class discussions and individual work because in the past this lesson has been difficult for some students. When I have assigned the problems with no prior discussions, I have had to scaffold for many of the students. Very few students were successful without help from the teacher. By breaking the lesson into two sections and having a class discussion be part of each section, I have created many scaffolds for all students so that each student can be successful. Class discussions also allow for students to listen to each others' questions and will sometimes have their own questions answered without having to ask the question themselves.

I wanted each student to work individually on the problems because of past experiences. In previous years and lessons, when students do partner work on word problems, some of the students rely on their partners to determine the operation each time. Since assessments are not usually partner assessments, allowing someone else to make the problem-solving decisions does not set each child up to be successful. When students are asked to work alone there is no opportunity to rely on someone else to do the thinking for them.

I choose to use poll everywhere because it gives each child a voice. Each child can share their thinking anonymously and not be afraid of being incorrect in front of the class. In addition, when I place the poll up before each child sends their responses, it can make for an interesting class discussion. Some students get swayed by answers that are already posted. We can have a discussion about how a majority answer does not always mean a right answer. Students need to be able to share a valid reason for choosing an answer. The use of poll everywhere allows the class to have these discussions. Lastly, poll everywhere graphs the responses for you instantaneously. Students can see their responses in real time in a format that is easy to interpret.

I chose to use the iPods and a shortcut because it takes less time for students to respond than the alternatives. If students use laptops to respond, it can take a long time for the laptop to turn on and for students to log on. I almost always have at least one student who cannot remember their password or has trouble accessing the Internet on the laptops. With the iPods, students just have to push the home button and then find the shortcut to access the site. Also, connecting to the Internet is much more reliable than the laptops. The time spent using the technology is much shorter so more time can be devoted to the math.

I wanted to add a shortcut to the home screen because it seems to also be the quickest way to access the website. Typing in the URL has caused issues in the past because students often type the URL incorrectly and cannot figure out why the site is not connecting. I have also tried QR codes to access sites but often times it takes awhile for the QR reader to actually read the code. The students have to spend time placing the code “just right” in the reader. A shortcut provides the more efficient way to access the website.

## **Assessment Plan**

I will assess student learning in this activity in several ways. First, I will look at the poll everywhere results to assess student learning as a whole class. If a majority of the responses to both the operation and solution polls are correct, then I will know that the learning objective was met for the lesson. Next, I will

listen to student responses when having the whole class discussions. Students who can accurately explain their thinking to their peers and help to answer questions will have met the learning objective. I will also look at student homework to assess student learning. If students can answer 85% of the homework questions about decimal word problems correctly, then the learning objectives were met. Finally, students will be given a unit assessment that will contain decimal word problems. If students can choose the correct operation and find the correct solutions on this test, then the learning objectives were met.

**Learning Activity Rubric**

| <b>Category</b>                | <b>3 Points</b>  | <b>2 Points</b>  | <b>1 Point</b>   | <b>0 Points</b>   | <b>Score</b> |
|--------------------------------|--|--|--|---|--------------|
| <b>Activity Description</b>    | There is a very clear and detailed description of the plan that details what the students and teacher will be doing throughout the duration of the activity.                         | There is a fairly clear description of the plan that details what the students and teacher will be doing throughout the duration of the activity.                                      | There is a general description of the plan that details what the students and teacher will be doing throughout the duration of the activity.                                   | There isn't a clear description of the plan that details what the students and teacher will be doing throughout the duration of the activity.                                 |              |
| <b>Technology Integration</b>  | The plan clearly states how technology will be used to enhance learning. The plan also indicates how students will be supported during the project.                                  | The plan states how technology will be used in the learning environment. The plan mostly indicates how students will be supported during the project.                                  | There is a general statement about how technology will be used. The plan partially indicates how students will be supported during the project.                                | There is not a clear statement about how technology will be used. The plan doesn't indicate how students will be supported during the project.                                |              |
| <b>Learning Objective</b>      | There is a clear connection between the design of the activity and the stated learning objectives. The activity is well suited to help students meet the stated objectives.          | There is a connection between the design of activity and the stated learning objectives. The activity is mostly suited to help students meet the stated objectives.                    | There is a minimal connection between the design of the activity and stated learning objectives. The activity is partially suited to help students meet the stated objectives. | There isn't a clear connection between the design of the activity and the stated learning objectives. The activity is not suited to help students meet the stated objectives. |              |
| <b>Connection to Standards</b> | Several relevant content and technology standards are stated in the learning objective.  | Some relevant content and technology standards are stated in the learning objective.   | Very few relevant content and technology standards are stated in the learning objective.   | No relevant content and technology standards are stated in the learning objective.  |              |
| <b>Student Prior Knowledge</b> | Student prior knowledge and skills have been taken into consideration and adequate support has been designed into the activity to help the students be successful in their learning. | Student prior knowledge and skills has mostly been taken into consideration and some support has been designed into the activity to help the students be successful in their learning. | Student prior knowledge and skills has partially been taken into consideration and support has been designed into the activity on a limited basis.                             | Student prior knowledge and skills have not been adequately factored into the planning of the activity.   |              |
| <b>Content Knowledge</b>       | All of the content knowledge (CK) required of the teacher to successfully execute this   | Most of the content knowledge (CK) required of the teacher to successfully execute this  | Some of the content knowledge (CK) required of the teacher to successfully execute this  | Very little of the content knowledge (CK) required of the teacher to successfully execute this  |              |



|                               |  |   |   |   |  |
|-------------------------------|--|---|---|---|--|
|                               | activity is clearly stated in the plan.  | activity is stated in the plan.   | activity is stated in the plan.   | activity is stated in the plan.   |  |
| <b>Pedagogical Knowledge</b>  | All of the pedagogical knowledge (PK) required of the teacher to successfully execute this activity is clearly stated in the plan. | Most of the pedagogical knowledge (PK) required of the teacher to successfully execute this activity is stated in the plan.             | Some of the pedagogical knowledge (PK) required of the teacher to successfully execute this activity is stated in the plan.             | Very little of the pedagogical knowledge (PK) required of the teacher to successfully execute this activity is stated in the plan.      |  |
| <b>Technology Knowledge</b>   | All of the technology knowledge (TK) required of the teacher to successfully execute this activity is clearly stated in the plan.  | Most of the technology knowledge (TK) required of the teacher to successfully execute this activity is stated in the plan.              | Some of the technology knowledge (TK) required of the teacher to successfully execute this activity is stated in the plan.              | Very little of technology knowledge (TK) required of the teacher to successfully execute this activity is stated in the plan.           |  |
| <b>TPACK Analysis</b>         | The learning activity includes a logically supported rationale for the technological and pedagogical decisions made throughout.    | The learning activity includes a logically supported rationale for most of the technological and pedagogical decisions made throughout. | The learning activity includes a logically supported rationale for some of the technological and pedagogical decisions made throughout. | The learning activity does not include a logically supported rationale for the technological and pedagogical decisions made throughout. |  |
| <b>Assessment</b>             | An adequate assessment plan has been created that clearly outlines how students and/or their work will be assessed.                | An adequate assessment plan has been created that outlines how students and/or their work will be assessed.                             | An assessment plan has been created that mostly outlines how students and/or their work will be assessed.                               | An adequate assessment plan is not provided.  |  |
| <b>Grammar &amp; Spelling</b> | There are no spelling or grammar errors.   | There are a few spelling and grammar errors.  | There are several spelling and grammar errors.  | There are multiple spelling and grammar errors.   |  |

**Comments:**

**Score: 33/33**